

Q1 desired shape. The aramid fiber composite substrate is comprised of a plurality of layers of aramid fibers arranged in either fabric or uni-directional tape structures. The aramid fiber composite substrate layers are stacked to achieve the desired thickness and protection, and are laminated using a variety of polymer compounds to create a singular element. The aramid fiber composite substrate is arranged to be generally parallel to the ceramic facing element such that the shape of the aramid fiber composite substrate mirrors that of the ceramic facing element.

Page 3 of the specification, after the paragraph referring to Figure 3 under the heading "BRIEF DESCRIPTION OF DRAWINGS", insert the following new paragraph:

Sub B Figure 4 is an enlarged partial schematic cross section taken through a three-dimensional aramid fiber structure of the aramid fiber composite substrate of the apparatus of the present invention with X and Y aramid fibers and Z aramid fibers (only one of which is shown) forming the fabric and with the Z aramid fibers extending back and forth along or about the Z-axis of the fabric structure.

Page 4 of the specification, amend the two paragraphs beginning on the eleventh line of the text, as follows:

Q3 Within the ceramic armor elements 11 are the singular or monolithic ceramic tile or facing element 12, the adhesive layer element 13, and the aramid fiber composite substrate element 14. The combined thickness of the ceramic facing element 12, the adhesive layer element 13, and the aramid fiber composite substrate element 14 falls in the range between 0.430-inches and 0.530-inches inclusively. The combined weights of the ceramic facing element 12, the adhesive layer element 13, and the aramid fiber composite substrate element 14 falls in the range between 4.00- and 5.70-pounds-per-square-foot inclusively. The ceramic facing element 12 may be made of any appropriate non-oxide ceramic material, for example, Boron Carbide, Silicon Carbide ceramics. Alternatively, a ceramic matrix composite or metal matrix composite containing Silicon Carbide or Boron Carbide particles may be used. Although ceramic thickness may be

Q3 varied to suit a specific need, the preferred ceramic arrangement ranges from 0.080-inches to 0.310-inches in thickness.

Disposed against and roughly parallel to back of the ceramic facing element 12 is the adhesive layer element 13 that forms a discreet layer.

Page 5 of the specification, amend the five paragraphs beginning on fourth line of text, as follows:

Disposed against the back of the adhesive layer 13, and roughly parallel to the back of the ceramic facing element 12, is aramid fiber composite substrate element or plate 14.

Q4 The aramid fiber composite substrate plate 14 may be made of any appropriate aramid fiber, such as Kevlar® or Twaron® fiber having a fineness ranging from 250- to 3,500-denier. Aramid fiber constructions such as fabrics, unidirectional tapes, felts, non-woven layers, or three-dimensional structures may be used. For example, aramid fiber fabrics in plain, basket, or twill weave styles with basis weights between 3.5- and 20.0-ounces-per-square-yard may be used; aramid fiber unidirectional tapes with all tapes arranged in 0, 15, 30, 45, 60, 90-degree orientation or combinations thereof may be used; or three dimensional structures that incorporate stitching or fiber axes along or about the z-axis of the fabric may be used. The aramid fiber composite substrate layer 14 is arranged to create a uniform structure that ranges from 0.130-inches to 0.350-inches thickness.

The aramid fibers of the aramid fiber composite substrate plate 14 are encased in a polymer matrix to form a rigid laminate. Virtually any appropriate polymer resin may be used for the matrix, for example Phenolic, Phenolic Polyvinyl Butyral rubber blends, Polyester, Vinylester, polyurethane, and polyolefin resins. For convenience, the aramid fiber composite substrate plates illustrated in the drawing Figures are cross hatches as metal.

When the aramid fiber composite substrate plate 14 employs a polymer resin matrix, the preferred resin content ranges from fifteen to twenty-four percent by weight.

An alternate embodiment 20 of the present invention is illustrated in Fig. 3. Figure 3 comprises a perspective view, partially broken away and in partial section, of apparatus 20 of the present invention where the ceramic armor assembly 19 comprises